Observation vs Experimentation

1) Define the following Terms:
    a. Observational Study
    b. Experimental Study
    c. Explanatory Variable(factors)
    d. Response Variable
    e. Confounding Variable
2) Describe the differences between an Observational Study and Experimental Study.
3) Identify any confounding variables from the following studies:
    a. The article "Panel Can't Determine the Value of Daily Vitamins" summarized the conclusions of a government advisory panel that investigated the benefits of vitamin use. The panel looked at a large number of studies on vitamin use and concluded that the results were "inadequate or conflicting".
    b. Studies have shown that people over age 65 who get a flu shot are less likely than those who do not get a flu shot to die from a flu-related illness during the following year. However, recent research has shown that people over age 65 who get a flu shot are also less likely than those who don't to die from any cause during the following year. This has led to the speculation that those over age 65 who get flu shots are healthier as a group than those who do not get flu shots.
    c. The article "Heartfelt Thanks to Fido" summarized a study that appeared in the American Journal of Cardiology. In this study researchers measured heart rate variability (a measure of the heart's ability to handle stress) in patients who had recovered from a heart attack. They found that heart rate variability was higher (which is good and means the heart can handle stress better) for those who owned a dog than for those who did not.
4) What type of study would you use to make generalizations from a sample to a population?
5) What type of study would you use to make cause-effect relationships from a sample to a population?
6) The article "Television's Value to Kids: It's All in How They Use It" described a study in which researchers analyzed standardized test results and television viewing habits of 1700 children. They found that children who averaged more than 2 hours of television viewing per day when they were younger than 3 tended to score lower on measures of reading ability and short-term memory.
    a. Is the study described an observational or experimental study?
    b. Is it reasonable to conclude that watching two or more hours of television is the cause of lower reading scores? Explain.
    c. Identify any potential confounding variables in the study.
7) The article "Acupuncture for Bad Backs: Evan Sham Therapy Works" summarized a study conducted by researchers at the Group Health Center for Health Studies in Seattle. In this study, 638 adults with back pain were randomly assigned to one of four groups. People in group 1 received the usual care for back pain. People in group 2 received acupuncture at a set of points

tailored specifically for each individual. People in group 3 received acupuncture at a standard set of points typically used in treatment of back pain. Those in group 4 received fake acupuncture—they were poked with a toothpick at the same set of points used for the people in group 3! Two notable conclusions from the study were: (1) patients receiving real or fake acupuncture experienced a greater reduction in pain than those receiving usual care; and (2) there was no significant difference in pain reduction for those who received acupuncture (at individualized or the standard set of points) and those who received fake acupuncture toothpick pokes.

   a. Is this study an observational study or an experiment? Explain.
   b. Is it reasonable to conclude that receiving either real or fake acupuncture was the cause of the observed reduction in pain on those groups compared to the usual care group? What aspect of this study supports your answer?

8) The Article "Display of Health Risk Behaviors on MySpace by Adolescents" described a study in which researchers looked at a random sample of 500 publicly accessible MySpace web profiles posted by 18-year olds. The content of each profile was analyzed. One of the conclusions reported was that displaying sport or hobby involvement was associated with decreased references to risky behavior (sexual references or references to substance abuse or violence).
   a. Is the study described an observational study or an experiment?
   b. Is it reasonable to generalize the stated conclusion to all 18-year olds with a publicly accessible MySpace web profile? What aspect of the study supports your answer?
   c. Not all MySpace users have a publicly accessible profile. Is it reasonable to generalize the stated conclusion to all 18-year old MySpace users? Explain.
   d. Is it reasonable to generalize the stated conclusion to all MySpace users with a publicly accessible profile? Explain.
9) An article titled "Guard Your Kids Against Allergies: Get Them a Pet" described a study that led researchers to conclude that "babies raised with two or more animals were about half as likely to have allergies by the time they turned six."
   a. Do you think this study was an observational study or an experiment? Explain.
   b. Describe a potential confounding variable that illustrates why it is unreasonable to conclude that being raised with two or more animals is the cause of the observed lower allergy rate.